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UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

June 3, 1970

EVEN-AGE MANAGEMENT

on The

MONONGAHELA NATIONAL FOREST

by the

Chief's

Special Review Committee

J. B. Hilmon
Washington Office

Howard R. Orr
Region 8

Charles Rindt
Washington Office

Howard W. Lull, Chairman
Northeastern Forest
Experiment Station

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UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

REPLY TO: 2470 Silviculture Practices

June 3, 1970

SUBJECT: Special Review Committee on Monongahela National Forest

TO: Edward P. Cliff, Chief

In response to your letter of March 23, 1970, we have examined the application of current and planned timber harvesting and other management practices on the Monongahela National Forest. Our findings and recommendations are presented in the enclosed report.

We acknowledge with appreciation the valuable assistance of the Supervisor and Staff of the Forest in making arrangements for our two visits and for the thorough and open nature of their presentations to us. The criticisms in our report in no way detract from the high level of competence and vigor with which the Staff is operating.

We appreciate the opportunity to undertake such an assignment. Our educations have been broadened and our functional opinions tempered by it.

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PREFACE

The controversy over clearcutting practices on the Monongahela National Forest did not derive from a vacuum. It started with a major change by the Forest Service in the system of forest management. It grew when the technical correctness of this change was questioned by a few laymen largely on the basis of a deeply-held belief (derived in part from earlier Forest Service teaching) that clearcutting is a destructive practice. The controversy enlarged, fueled by mistakes, fanned by distrust, and heated by emotions. All involved to a degree are responsible for its development; all must help find a solution.

We believe this controvery can be quieted and settled by development of stronger communications between Forest Service and public, by forging Service-Community ties to discuss and solve Community-Forest problems, and by fostering a joint realization that in this Forest of multiple use not everyone can have everything they want all the time. Community welfare must involve to some degree self-sacrifice by all: this Community includes both the Forest Service and the people it serves.

In presenting this report this Committee acknowledges the climate of openness and honesty which from the first has marked this review. Candid acknowledgements of mistakes, fears, frustrations, and hopes were expressed by Forest Service people at all levels from Washington to the District. Critical passages in this report are derived in great part from self-criticism openly voiced and discussed. We are grateful for help of those outside the Service who often vigorously expressed to us their views: lay people, professors, and foresters and other professional people. We hope this report can serve as one vehicle to carry what we saw, heard, and concluded towards an early solution of problems encountered.

Even-Age Management on the Monongahela National Forest

A Report by the Special Review Committee

This report concerns the controversy that has followed introduction of a system of even-age management on the Forest. Public objections first manifest in 1964 were repeated in 1967 and grew in 1968 and 1969. In 1970 the controversy became serious enough to generate a special inquiry by the West Virginia legislature, numerous meetings of Forest Service officials with local residents, considerable publicity, a suggestion that a moratorium on new sales involving clearcutting be declared until the issue was resolved, and the appointment by the Chief of the Forest Service of this Committee to "...examine the application of current and planned timber harvesting and other silvicultural practices on the Monongahela National Forest in the light of available knowledge from research and management experiences in the fields of soil and water, fish and wildlife, recreation, and timber management..."[1/]

This report is divided into four parts. Part I gives background material: a brief history of the Forest and the development of the controversy about cutting practices. Part II concerns the effects of clearcutting on timber, water, wildlife, and recreation. Part III is a critical review of Forest Service policies and programs, and Part IV gives Committee recommendations.

The time prescribed for preparation of this report allowed two weeks in the field (itinerary in the Appendix) and four weeks for study, discussion, and writing. Members of this Committee were chosen partly on the basis that they had not been involved in the problems of the Monongahela and therefore could view the situation with objectivity engendered by unfamiliarity. The six weeks did not permit careful study and documentation of specific forest situations and areas deemed controversial. It did permit, however, a steadily deepening acquaintance, as travel and discussions proceeded, with people and problems, a growing realization of the complexity of the situation and the impossibility of any simplistic solutions, and finally the emergence of some critical findings and recommendations.

1/Memorandum of March 23, 1970, to the Special Review Committee.

PART I BACKGROUND

The Monongahela National Forest was established in 1920.[2/] By 1938 most of its present area of 820,254 acres had been purchased and set aside. The Forest comprises 7 percent of the State's forest area.

Under Forest Service protection and management, this Forest, once known as "The Great Burn" and "Great Brush Patch" has become a valuable forest property. During the past 50 years (1920-69), 600,000 MBF of timber have been sold for $9 million. Of this amount about $2 million has returned to counties. During this period soil and water resources were given greater protection, wildlife increased, and recreation use multiplied. Thirty major sawmills get part or all of their timber from the Forest. Woodworkers and mill employees total about 850 with an annual payroll of about $5 million. The Forest attracts about 1 million visitor-days use a year, a good share of West Virginia's tourism. A synopsis of past and current use of the Forest is given in the Appendix.

Up to 1964, the Forest was managed under an all-age management system (selection cutting). Beginning in 1964 this system was changed to even-age management that, silviculturally, involves clearcutting of some areas for harvest and regeneration objectives, (photo 1), and intermediate cuts in the succeeding stand to control species and growth.

In 1969, with preparation of multiple-use plans, the administration of the Forest was broadened to include all-age management of forest areas assigned to travel and water zones. Currently, the multiple-use designations by areas are as follows:

	Acres
Water influence	53,202
Travel influence	46,593
General forest	671,815
Special	48,644
	820,254

Change from all-age to even-age management in 1964 marked the beginning of controversy. Hardly had the change been announced when the House of the West Virginia Legislature in February 1964 passed a resolution calling for a study "...of the current forest

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2/ The Forest was purchased under authority of the Week's Law of March 1, 1911, which authorized the Secretary of Agriculture "... to examine, locate, and recommend for purchase such forested, cutover, or denuded lands within the watersheds of navigable streams as in his opinion may be necessary to the regulation of flow of navigable streams or for the production of timber." (36 stat. 961-963) as amended.

REGENERATION CUT 1966
THIS 18-ACRE STAND WAS CLEARCUT TO PERMIT VALUABLE LIGHT DEMANDING TREES TO BECOME ESTABLISHED AND GROW RAPIDLY INTO VALUABLE FOREST TREES. THESE AREAS PROVIDE VALUABLE FOOD AND COVER FOR WILDLIFE.
EVEN-AGED MANAGEMENT

Photo 1. Clearcutting and regeneration.

management practices being carried out in the Monongahela National Forest and a change of policy of that management."[3/] The result was a report by the Director of the Department of Natural Resources of the State of West Virginia with concurrence of the Dean of the College of Agriculture, Forestry, and Home Economics, West Virginia University, "...there appears to be no reason to be critical of the present practices. Management of the National Forest is the responsibility of a staff of competent and technically trained men, each aware of his particular charge to manage for the public interest and benefit.[4/]

In 1967, the West Virginia Legislature again passed a resolution asking for an investigation of timber practices on the Forest. This one set up a legislative committee composed of five members each from the House and Senate. One meeting was held with four members present and a report was issued by the Chairman of the House

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3/West Virginia House of Delegates Resolution No. 5, Feb. 15, 1964.

4/Letter of Director of the Dept. Natural Resources to The Honorable H. Laban White, Speaker of the House of Delegates, Jan. 11, 1965.

group recommending "That the Forestry Services be implored to cease and desist from the 'clear-cut' practices;" and, "That the selective cutting practice be re-employed."5/ The 1968 Legislature did not adopt this report.

In 1970 the West Virginia Legislature passed a third resolution on this matter, "Memoralizing the executive and legislative branches of the government of the United States to take prompt and effective action to curtail the practices of clearcutting on National Forest land in the State of West Virginia, and creating a legislative commission to evaluate this problem and suggest solution thereto."6/

The commission, called the Forest Management Practice Commission, comprises five senators, five delegates, and four persons "with a knowledge of conservation and forestry". Currently they are holding hearings and taking testimony from volunteers and invited witnesses. Their report is due August 1.

In recent weeks this matter was also considered in a series of meetings between U.S. Senators Robert C. Byrd and Jennings Randolph and officials of the U. S. Forest Service. Out of these sessions came a request for a scientific study of clearcutting practices on the Monongahela National Forest. Forest Service accedence to this request was the genesis of this Special Review Committee.

A careful review of testimony and correspondence dealing with the three legislative reviews and a reading of press clippings strongly indicate that this controversy is centered in the Richwood area in the Gauley Ranger District. This is the District where the greatest amount of clearcutting has been done. Review and reading also suggest that vocal opponents to even-age management are few, perhaps not more than a half-dozen individuals. They have however, through newspapers, conservation groups, and the State Legislature, been able to influence a larger number of people who, out of their concern, have written their Congressional representatives. Interviews given in the Appendix, with opponents, middle-roaders, and proponents indicate the wide variety of beliefs and something of their intensities.

Proponents of even-age management include most professional foresters in public and private employment and conservationists including Federal, State, and University officials. Opponents are

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5/ House Concurrent Resolution No. 47, adopted March 11, 1967: Report of the Special Committee to investigate forest management practices employed in National Forests, Feb. 6, 1968.

6/ West Virginia Senate Concurrent Resolutation No. 22, 1970.

mostly forest users: hunters and recreationists, fearful that even-age management will damage wildlife and scenic resources and cause floods and erosion. The considerable public interest in this matter signifies the high value of this Forest to West Virginians and their concern that it be managed correctly.

PART II. EFFECTS OF EVEN-AGE MANAGEMENT

Effects on Timber

Even-age management, as compared to all-age, produces as much timber per unit area, has a shorter rotation, provides better control of species, lends itself to better growth projection, inventory procedures, and more efficient timber-management operations. All-age management has for its principal advantage the maintenance of a continuous forest cover, unlike even-age which at harvest usually requires clearcutting. Both systems are used on the Forest to meet different management objectives. To understand their different functions requires some definitions.

All-age management

This system is based on the principle of maintaining a stand of trees composed of all ages on each acre. The silvicultural practice for all-age management is limited to selecting individual trees or small groups of trees to cut in the harvest phase of the management process. Regeneration and growth of young trees, therefore, are usually in the shade. This limits the new growth to shade-tolerant species which gnerally are slower in growth and more likely to be of poor form and quality than trees which regenerate and grow in sunlight.

Also, all-age management has a questionable effect on other resources. For while the all-age system tends to maintain existing game habitat and the familiar forest view, it creates a gradual change and in some timber types a deterioration over the years as the forest changes to shade-tolerant species of trees, shrubs, and plants. The result is a sameness of timber and vegetative types that discourage a variety of wildlife and may detract from the visual resource.

All-age management is useful along roads and streams where preservation of continuous cover is visually important (photo 2) and where the shade is beneficial to streams and stream-side values.

Photo 2. Where streamside cover was not preserved.

Even-age management

Even-age management is based on the principle of developing stands in which the crop trees are of the same age. All age classes are represented in a management unit but they are distributed throughout the unit in even-age stands instead of as individual trees. In a sense, it could be called all-age management by even-age stands. This management system allows the use of several silvicultural practices depending on the site and the composition and condition of a stand. Species composition can be controlled: shade-tolerant species can be obtained by regenerating the stand un under a heavy shelterwood; intolerant hardwoods can be obtained by complete removal of the overstory. On the Monongahela, an abundance of most species is regenerated in full sunlight of clearcut openings (photos 3 and 4). The mixture of species that is wanted or that is best adapted to the site can be encouraged by weeding and other intermediate practices. Cutting and dispersing the regeneration cuttings create a diversity of forest conditions throughout a management unit. The variety can improve wildlife habitat and scenery.

Photo 3. Flags mark seedling-species.

Photo 4. Regeneration 5 years after cutting.

Silvicultural practices used in the even-age management system include intermediate treatments such as weeding, thinning (photo 5), and improvement cuttings while the stands are growing to maturity. All of these intermediate treatments are accomplished by tree selection. (Selection cutting is extensively employed in even-age management as well as in all-age management). Intermediate silvicultural treatments serve dual purposes of improving the timber stand and of utilizing trees that would otherwise die because of crowding and shading.

Photo 5. Young hardwoods in need of thinning.

When a stand matures under the even-age management system, it is regenerated by one of several kinds of regeneration cutting such as shelterwood, seed tree, or clearcuttings. Generally, the hardwood stands on the Monongahela National Forest regenerate better on clearcut areas: a better mixture of species is obtained, and there is faster growth. Usually, seed trees are not needed because of a liberal amount of seed already in the ground; or, in the case of oak and northern hardwood stands, a satisfactory low understory is generally present.

The source of much public criticism and apprehension about clearcutting is the appearance of logged areas immediately, and for a few years, after cutting. The cull material tops and branches can dominate the view (photo 6) and the situation is aggravated by the sharp contrast with adjacent uncut timber stands. Objections are particularly strong when this occurs in a timber stand that has had special or personal significance to individuals or groups of people because of hunting, hiking, or other recreational experiences.

Photo 6. Clearcutting close-up.

Would successive tree crops under even-age management deplete the soil of nutrient elements and thus reduce soil productivity? According to Carol Wells of the Southeastern Forest Experiment Station, Committee Consultant on nutrient cycling, timber harvesting removes only small quantities of nutrients. Taking nitrogen, for example, the forest soil may contain as much as 6,000 pounds per acre. The forest may remove in 100 years 100 pounds per acre or 1 pound per acre per year. Nitrogen added from annual rainfall, 5 pounds per acre per year, exceeds this loss. Nutrient losses to streamflow, following clearcutting, are not regarded as serious. With

only small portions of a watershed cut, the increase in streamflow would be small and the nutrients added may be beneficial for the food chain and ultimately to fish.

Managing the timber

Prior to public ownership parts of the Monongahela National Forest had been clearcut and parts had been cut selectively. Selective cutting was not based on a management system and had no relation to all-age management as it applies to sustained-yield management of the timber resource. Tree-selection was usually based on merchantability for a certain market or on a profit margin by which trees of good quality were cut and lower quality trees were left; in its worst form, "high grading".

Timber stands now growing on the Monongahela are mostly even-age and reflect the cutting practices of their origin. There are about 31,000 acres of old-growth timber of the 120-year and older age class in which there has been little or no cutting. These stands are scattered throughout the forest. Some are on ridge tops where they were left by the original logging operators because of low quality and high logging costs. Others are good quality stands on better timber sites, left or overlooked by the original loggers for various reasons. These stands are past maturity and are putting on little or no growth. They do not lend themselves to all-age management.

In the Forest there are about 67,000 acres in the 60- to 100-year age class, 252,000 acres in the 30- to 60-year age class, and 95,000 acres in the 0- to 30-year age class in stands of various sizes and types. They originated from clearcutting, or fire, or both, that occurred over the past 100 years. Some of the older stands in the 60- to 100-year age class are approaching the age and condition for regeneration cutting. The younger age classes lend themselves to thinnings and improvement cuts. The extent of this work that can be done depends in great part on the market for pulpwood and other products that can utilize small sizes and low quality.

About 330,000 acres are classified as all-age stands that have resulted mostly from selection cutting. In most cases they are in fact even-age stands with an overstory of trees 100 years

old and older with an understory that came in after the selective cut. Understory stands are of various ages that date back to the time of cutting. Their species and quality differ according to site and density of the overstory. The overstory usually contains a high percentage of low quality timber that was unmerchantable or uneconomic to remove when the areas were logged. Much of it is merchantable now. Because of the varied condition of these stands they require different silvicultural treatments to bring them under management. Stands that have a heavy overstory need to be regenerated. Other stands lend themselves to overstory removal and management of the established understory (photo 7). The condition of the stand dictates the silvicultural treatment, but here as in old-growth stand, cutting may be deferred or silvicultural practices altered where other forest resources or management objectives override timber production.

Photo 7. Overstory removed to release understory.

Multiple-use plans have been prepared for the forest which designate water influence zones, travel influence zones, recreation areas, scenic areas, and other areas of special consideration where management for timber is excluded or restricted. They constitute 20 percent of the Forest. The balance is classified as general

forest zone and is managed for all resources.

Present planning calls for clearcutting annually, for regeneration, about half of one percent (approximately 4,000 acres) of the forest area in scattered patches of various sizes. There will be the span of a rotation between regeneration cuts on any one area. In the interim there will be a succession of intermediate (selection) cuts while the crop trees grow to maturity. Partial cuttings will also involve about 4,000 acres. Current regeneration and partial cuttings fall short of the 6,000 and 16,000 acres, respectively, annual allowable cut under a sustained yield program.

Summary

Even-age management will produce more timber of desirable species per unit area than all-age management and has advantages of efficiencies in application and operation. For visual control, all-age management is used in travel zones and along streams for water quality control. There is little danger of site deterioration with successive rotationsof even-age management.

Effects on Water and Erosion

At its simplest, the greatest effects of even-age management on water supply and erosion are exerted at the clearcutting stage. These effects, for three reasons, are minor: first, because the floor, of a clearcut forest, that is undisturbed retains much of its runoff control and soil stabilizing properties: second, because properly employed safeguards in location, construction, and maintenance of roads, landings, and skid trails can keep overland flow and sediment out of streamflow: and third, because minor increases in peak flows and storm runoffs are diluted in the streamflow from the surrounding, predominantly uncut area. Intermediate cuts in even-age siliviculture would have even lesser effects. The remainder of this discussion is devoted largely to the effects of clearcutting.

Water Supply

Clearcutting will increase water yield by 20 to 40 percent or by 5 to 10 inches (135,770 to 271,540 gallons per acre) the first year after logging. Nearly all of this would come in summer and early fall when streamflow is normally at its lowest ebb. The first year's increase will rapidly diminish, usually to a negligible amount after 10 years. Thus, clearcutting annually 6,000 acres (the allowable cut) on the Monongahela over a 10-year period, and

assuming a first-year increase of 10 inches diminishing to zero at ten years, would give an average annual increase over the 60,000 acres of 3.88 inches, and an average over the total area of 820,054 acres of 0.28 inches, equivalent to a minor increase in yield of 1.1 percent.

The effects of clearcutting small areas scattered throughout the Forest would be most noticeable in the flow of small streams immediately tributary to the cutting. Thus, a 50-acre clearcutting with a normal water yield of 5 inches from June through October, would after clearcutting have a runoff of 8 inches, a 60 percent increase. Downstream, from a 50-acre clearcut and a 50-acre uncut watershed, the yield would be 6.5 inches, a 30 percent increase. Further, downstream, including a drainage area of 500 acres, 50 clearcut and 450 uncut, the yield would be 5.3 inches, or a 6 percent increase. For 5,000 acres it would diminish to 5.03 inches or 0.6 percent.

Peak Flows

Increases in water yield from clearcutting are greatest only during those periods when soil moisture content of the clearcut area is greater than that of the uncut, i.e., drying periods during the growing season. For most of the year (winter, early spring, and those intervals following rainfall when soil is equally wet in cut and uncut areas) storm runoff from both areas would be about the same.

This assumes, of course, that infiltration rates will not be reduced to the point that overland flow of any significant quantity will be generated. Research results at several locations have by now made this a safe assumption.

When there is a soil moisture differential between cut and uncut areas, peak flows and stormflow from small- and medium-size rainfalls may be 25 percent larger from the cutover area; for flood-producing storms the percentage of increase would be less.

The effect of these increases would also be masked in discharge downstream from the uncut forest. For instance, with a flood-producing runoff of 4 inches from an uncut forest and 4.40 inches from a clearcut, then from a 500-acre forested area containing a 50-acre clearcutting, the runoff would amount to 4.04 inches, a negligible increase.

Water Quality

Clearcutting can reduce water quality, but it need not. There is considerable evidence that proper location, construction, and maintenance of roads and skid trails (the principal sources of sediment) (photo 8) will minimize erosion and keep sediment out of streams. Critical factors involve properly separating road and stream, minimizing grade of roads, providing adequate drainage, and dispersing runoff from the road so that it does not reach the channel. Post-logging maintenance includes inspecting and checking drainage structures, and, as necessary reseeding (photo 9). When these precautions are not taken either due to improper planning or inadequate inspection, sedimentation can follow (photo 10). A protective zone of trees along the streams can prevent damaging rises in water temperatures.

Photo 8. Logging roads: sediment source.

Photo 9. Former logging road: properly stabilized.

Photo 10. Former logging road: improperly stabilized.

On the whole, in the Allegheny Plateau (about two-thirds of the Forest) there are no inherent erosion hazards which could not be avoided by well-planned and executed sales. The Ridge and Valley portion has steeper slopes, poorer sites with poor ground cover, and some limestone soils whose erosivity has not been determined. However, on more erosive soils like the Teas soils and colluvial soils on the Allegheny Plateau, and the poorly protected Litz and Weikert soils in the Ridge and Valley Province, logging practices must be modified and other special precuations taken.7/

Summary

Clearcutting as practiced on the Forest under present plans will not seriously damage water or soil. It will, in fact, improve water supplies by slightly increasing summer streamflow. Higher peaks and greater volumes of runoff from clearcutt areas will dwindle to negligible amounts as they are diluted downstream in discharge from the uncut forest. Maintaining high water quality requires adherence to well-known erosion-control practices, and special safeguards on more erosive soils and poorer sites.

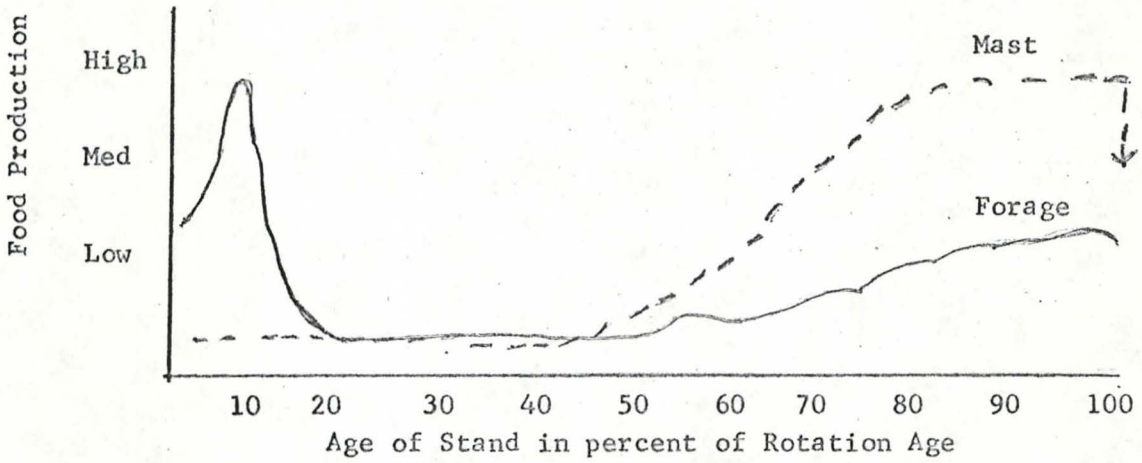
Effects on Wildlife

Wildlife and fish depend on the forest environment for food and cover. Even-age management, applied with full consideration of these necessities, can provide relatively high, stable populations of fish and wildlife within the constraints of the natural productivity of the forest. A given age class of the forest may not provide both food and cover for all wildlife; consequently the timing, size and distribution of cuttings are of critical importance to wildlife management. Under even-age management the wildlife manager must plan in terms of stands as they apply to long-term management of the entire unit.

7/ Preliminary study (modified). Erosion hazard during timber management. Monongahela National Forest. David L. Wenzel, May 8, 1970.

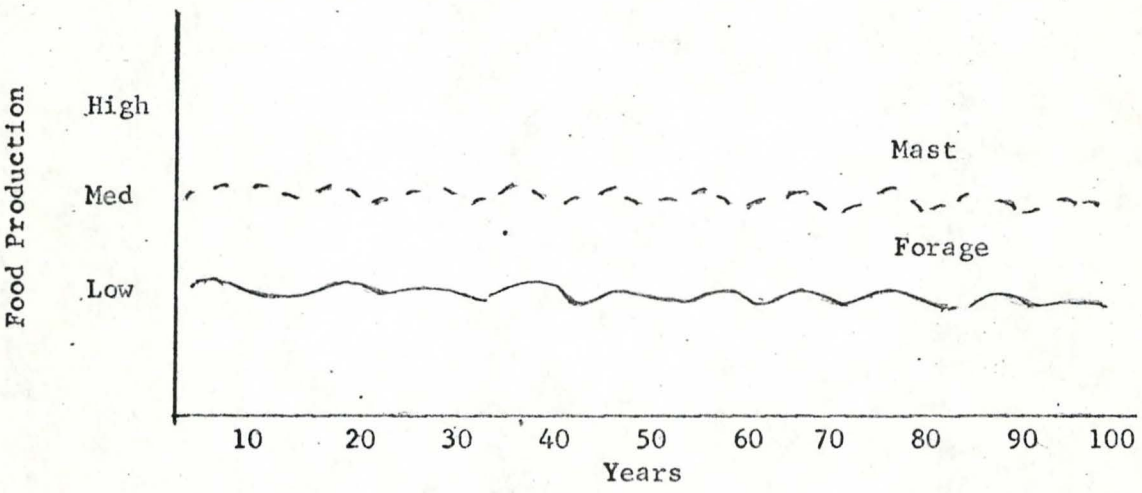
The following figures [8/] illustrate the general food production cycles in a stand cut by one of the two principal systems of silviculture management.

1. Clearcutting.



With proper distribution of cuts, peak wildlife food production can be maintained on a management unit.

2. Selection cut



[8/] Habitat management for turkeys in the oak-hickory forests of Missouri. G. P. Dellinger, 1970. Proc. Second Nat. Wild Turkey Symposium (Pending Publication).

For the first 10 years of a rotation following a regeneration cut, forage (and browse) is abundant, but mast (especially acorns) are absent or sparse. There may be exceptions, for example, when scrub oaks are present in the cut areas. However, mast production from these species is not dependable, particularly if the disturbance is not repeated frequently. For example, during the last 50 to 60 years of a 100-year rotation of an oak stand, acorn mast is abundant, but quantities of fruit and forage are low to moderate. Sapling and small pole-sized classes during the midrotation usually produce little forage and are not yet producing mast.

Proper management assumes some goals for wildlife populations have been set. A planned proportion of even-age stands should be in mast production to assure maintenance of carrying capacity for deer, turkeys, and squirrels. Mast, especially acorns, serve as a buffer against over-utilization of forage by deer and greatly enhances carrying capacity of the forest for deer and turkeys. Mast is a primary food of squirrels, and reproduction and population levels of this species vary directly with mast production. Daily rates of acorn use by turkeys, deer, and squirrels have been estimated at 0.25, 1.50 and 0.20 pounds respectively.[9/] The period of use ranges from 150 to 180 days. Adequate supplies of mast can be produced by the older stands of even-age forests. However, to produce optimum populations of wildlife, this mast potential must be provided for in a management unit.

The concept of "home range" of wildlife is essential to optimum production. Home range is not as yet well defined for the principal wildlife (deer, turkey, squirrel, grouse, bear) on the Monongahela. Range varies from a few acres for squirrels to several miles for bear. Most wildlife biologists agree, however, that management units ranging from 500 to 5,000 acres are acceptable in managing the forest for a variety of wildlife species.

For example, if a 1000-acre compartment is managed on a 100-year rotation, the "ideal" cutting from a wildlife standpoint would average 10 acres per year. If the compartment is entered only once in a 10-year period, the cutting should not exceed 100 acres. Biologists recommend that clearcuts be small and scattered through the management unit. When the regeneration plot exceeds the desirable proportion of the home range of an animal, habitat management is suboptimal for that species. The average clear cutting size of 50 acres or so on the Monongahela provides excellent opportunities for management of the principal game animals and birds.

Cover needs of wildlife can also be provided through even-age

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9/ Ibid., p. 17.

management. Special concern is often expressed about nesting habitat or den trees, especially for squirrels. If clearcuts are small and adjacent stands contain plentiful dens, the need for dens in the clearcut area is questionable. When dens are sparse in the compartment (which may be the case in young stands), special needs for dens should be considered prior to cutting in areas where management of den-requiring species is desirable.

Many headwater tributaries of trout streams play a vital role in trout production since they provide necessary spawning habitat and rearing areas for trout. Clearcutting small watersheds may alter the thermal environment of these trout nursery streams. The brook trout usually does not occur in waters in which temperatures rise much above 68°F. Maxima of streams on the Fernow Experimental Forest normally reach about 62 to 67°F. during the summer months. Weekly maximum stream temperatures rose 4 to 6 degrees during the first summer after cutting a 40-acre watershed at the Coweeta Hydrologic Laboratory in North Carolina. Treatments which left streamside vegetation to shade channel produced only minor changes in stream temperatures. These small streams respond rapidly to changes in microclimate. For example, the temperature of the mountain farm stream at Coweeta dropped from 80°to 68°F. after passing through 400 feet of forested channel. These data point out management opportunities for avoiding or adjusting adverse effects of timber cutting, but more information is needed on forest stream habitat..

Too little is known about the specific habitat requirements of songbirds, but the evidence available indicates songbird habitat needs can be provided under even-age forest management.

A study in Virginia showed, for example, that narrow clearcut areas had more birds during the breeding and late summer periods than adjacent uncut forest stands, but had fewer birds during winter.[10/] The increase resulted from the attraction of "non-forest" species and continued use of the cut areas by "forest" species. Forty to 60 percent of the breeding population on a cut area was forest species.

There has not been enough acreage clearcut on the Monongahela to affect wildlife populations. Within the 775,000 acres of commercial forest land, regeneration cuts were made on approximately

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10/ Woodland habitat for nongame birds. R. G. Hooper and H. S. Crawford. Trans. 34th North Amer. Wildlife and Nat. Resources Conf.: 201-207, 1969.

20,000 acres from 1964 to 1969. The average annual acreage regenerated has ranged from 306 acres on the Cheat District to 1142 acres on the Gauley District.

Summary

Control of stands under even-age management provides a greater variety of sites for wildlife than all-age management. Long-term planning is a requisite, however, to maintain the stability and variety of wildlife populations on the Monongahela. Substantial proportions of a good wildlife management unit must be in the mast-producing stage.

Effects on Recreation and Esthetics

Even-age management has had no measurable effect on recreation on the Monongahela National Forest. No statistics are available to support the position that current practices have had either positive or negative results.

Clearcutting on the Forest, however, have had severe negative effects on the visual resource. Even though they have by their placement had minor public exposure in terms of numbers of people, reactions have been strongly stated by some alert and articulate critics. As a result there has been a tendency to conceal the few clearcuttings that have been made. This is not necessary. Clearcuttings can be used to enhance the visual resource. The wide variety of changes in vegetation that are available in even-age management makes it a very desirable and necessary tool of landscape management.

The potential strong effect of clearcutting on the visual resource stems from the visual process. Basically, people see everything in terms of contrast in visual dominance factors (motion, form, line, color and texture). Without contrast in any one or any combination of these factors we could see nothing. Strong contrasts are easily seen and register strongly. Under even-age management, heavy shelterwood or regeneration cuts produce strong contrasts in form, line, color, and texture, depending upon viewing position and motion of the viewer. If these strong contrasts are not skillfully used there will be general strong negative reaction on the part of the public. If they are skillfully used, very positive desirable visual effects can be created (photo 11).

Photo 11. At center: a properly designed clearcut.

Actually, visually acceptable variety is desirable and enhances the landscape. Its production begins by recognizing that in all situations there is a characteristic landscape. The visual impact of clearcuttings can produce shocking variation from the characteristic landscape but may be modified through location, shape, and size of areas to produce desirable variety and in some cases greatly enhanced composition.

Summary

Even-age management has had no effect on recreation use. With proper design, clearcuttings can be used to provide variety to the landscape and enhance the visual resource.

PART III. APPLICATIONS OF EVEN-AGE MANAGEMENT: A CRITICAL REVIEW

There is no question that even-age management, correctly applied, provides an orderly and beneficial system for regulating timber productions. Research and experience testify to its several advantages. Its influence on the Monongahela National Forest can indeed be beneficial. As foregoing discussions have pointed out, even-age management can produce the greatest amount of timber and the most desirable regeneration; it will tend to increase water yields slightly during summer months, it will not cause floods, under proper care water quality will not be reduced; it can benefit and increase the population of deer, grouse, rabbits, and squirrels (its effects on turkeys are not yet known); it will not harm recreation and it can provide variety to the visual resource.

Why then the controversy? Why the public conern? Why the need to appoint this Committee? Not because of the even-age management system. The system is not on trial. On trial is the manner in which this system has been applied.

Critical consideration of this aspect takes this Committee out of its specialized fields of silviculture, water, wildlife, and recreation into areas governed largely by administration and involving in large part public relations and education. It also takes us into critical consideration of some Forest Service policies in general. For the problems of the Monongahela are Service-wide.

This critical review deals but little with specific errors of commission and omission. Time and space limitations forbid critical review of each disputed clearcutting. Employing the ready weapon of hindsight, our criticism deals with attitudes, communications, and activation of policies: the climate of controversy as we could sense it.

Multiple Use

Multiple use has not been adequately applied.

In several instances as this Committee visited clearcut areas that admittedly were poorly located or too large or both, the common explanation was that under recently prepared multiple-use plans the objectionable features would no longer be in evidence. What this

amounts to is that to some degree the areas publicly criticized were cut before multiple-use plans were prepared. They were cut in the period 1964 to 1968, four to eight years after 1960 legislation directing multiple-use management--a disquieting hiatus. The multiple-use management guide for the Monongahela is dated November 11, 1969.

Forest resource inventories are inadequate

Inventories of forest resources are not adequate to ensure that management of all resources will receive proper multiple-use planning. For instance, good resource inventories are necessary to time, size, and space clearcuttings. Location and acreage of timber types should be more accurately inventoried. Mature timber is of public concern: there is a definite feeling that the Forest's relatively small acreage of mature timber (31,000 acres) is in danger of being cut first without reference to long-range resource planning. Also, wildlife inventories are admittedly weak. And as yet there has been no adequate inventory of recreation and no inventory of visual resources. Nor are there any inventories of public need; an assessment of the long-time requirements for timber, water, wildlife, and recreation. Nor have there been public discussions of these needs.

Multiple-use planning is incomplete

With inadequate inventories of forest resources and of public needs, planning cannot proceed to the point of orderly management of timber supplies, wildlife, and other resources. There can be, for instance, no long-range planning as to where timber will be harvested and how much in any one location. Nor is long-range planning possible for management of deer browse through successive clearcuttings. Currently, it is especially difficult for State biologists to advise rangers on specific timber sales when long-range plans for the compartment are not available. Further, planning processes seem inadequate. There has been too little involvement of the public in the planning process. The mechanics of planning are unsatisfactory. For instance, according to the multiple-use flow chart (FSH 2121.4), multiple-use somehow, by some magic, will result from planning the management of single resources. Multiple-use planning, by definition, must involve a team approach.

Resource programs are not adequately staffed

There was a general agreement that multiple-use management will not be effective until individual programs are properly manned. Right now there is a disproportionate emphasis on timber-management. Forest-wide there are 19 timber managers, 4 wildlife managers (including State cooperators), 2 soil and water managers, 1 recreation manager, and 2 landscape architects. There seem to be no realistic estimates as to how many people would be required in the various disciplines, to plan and carry out a genuine multiple-use program. In our discussion, it was obvious that timber was the only single-use program that had quantitative goals, pressures to meet them, and personnel to carry them out. Basically at fault are present organizational and financial systems that continue to emphasize timber management above all other resources despite multiplying evidence that public demands today call for the multiple-use the Service has better preached than practiced.

Specific Uses

Obvious weaknesses in multiple-use programs are reflected in management performance in specific areas of which the following are some examples.

Water quality problems derived from insufficient supervision

The Forest's May 8, 1970 report on erosion hazard during timber harvest[11/] states that in both the Allegheny Plateau and Ridge and Valley Province, most erosion problems were violations of existing recommended practices. Examples of water quality problems were observed by the Committee at Stalnaker Run in the Cheat District (siltation of a native trout stream and a fish hatchery), and in the White Sulphur Springs District at Meadow Creek (soil from an improperly located log landing was washing directly into the creek (photo 12), and the Burnt House Sale (a short section of a logging road was eroding because of inadequate turnouts). These incidents compose very likely a relatively minor part of the total management job, but they do support public concern about mismanagement. Lack of manpower is the problem. The report cited above also notes that "the quality of timber sales administration work need improvement. Increased quality will demand an increase in man hours spent in administration."

11/ Ibid., page 16.

Photo 12. Sediment moves from landing to stream.

Wildlife management planning questionable

The Forest Wildlife staff and the wildlife cooperators from West Virginia Natural Resources Department do not provide sufficient staff to ensure a mature wildlife conscience. The Forest Wildlife staff man wears three hats: he is also responsible for watershed and range functions. The two State Wildlife biologists assigned to assist the Forest have numerous other duties in addition to advising rangers on impacts of timber sales on wildlife. Rangers and their staffs need this advice for most of them have limited background of wildlife management. As a result wildlife values are not given full consideration in planning, spacing, timing, or size of recent regeneration cuts. For example, in the Glade Run area of the Greenbriar District, overstory trees from an earlier shelterwood

cut of 645 acres were cut in one block (photo 13). The District was planning to cut additional acreage in 1970-71 in the same 5000-acre wildlife compartment. Although planned cuts did not exceed guides for wildlife, long-term plans for the compartment were not available. Four other cuts of this magnitude were observed. None included long-range planning for wildlife.

Photo 13. Extensive area of young growth.

Visual resources are being neglected

There are not enough landscape architects for acceptable accomplishment and the result is a lack of understanding of landscape management and the visual resource throughout the Forest. For example, professional foresters look at their clearcuttings from the silvicultural view: they see the regenerating forest. To the public, there is very little difference between some Forest clearcuts and forest devastation. They look just like they have been described by some of our vocal public, "disaster areas" (photo 14).

Photo 14. Clearcutting: visual impact.

Misunderstandings were evident during our field trips when District and Forest personnel spoke with equal concern for esthetics in areas of no visual exposure and moderate to strong visual exposure. Concern should have varied greatly between these areas.

One stop was made to look at a private timber sale. Comments by District and Forest people centered around the fact that the criticizing public did not complain of poor practices on such private land. But from a visual point of view this particular situation was very predictable. First of all, the area was visible only from a winding road requiring maximum attention of the driver and evoking considerable apprehension on the part of the passenger. Secondly, even if the viewers were to stop and look, as we did (photo 15), the contrast in visual dominance factors resulting were minor even with the foliage off and will be less with foliage on (photo 16).

Photo 15. Stop, then look at clearcutting

Photo 16. Private clearcutting with little visual impact.

Information and Education

No intensive I&E program introduced even-age management

Introduction of even-age management in 1964 as the primary management system for the general forest area was accomplished without a program of public education and discussion. It wasn't until 1967 that an intensified I&E program was proposed. After public controversy developed there was a strong effort to meet with interested groups to discuss the issue. In 1969, for instance, thirty-six meetings were held with service clubs, schools, and conservation groups. To some degree, however, the horse had already escaped: some minds were already made up and have been impervious to the most well-reasoned arguments.

The present I&E program is inadequate

Numerous meetings with interested groups have had some effect in quieting the clearcutting controversy. A few, particularly of the show-me trip variety, were poorly attended. Also, there has been little or no use of radio or TV media. Newspaper articles by opponents of even-age management have had considerable influence; there has been no knowledgeable public-relations effort to answer immediately some of their mis-statements. We wonder, for instance, why photos of well-established saplings on clearcuttings were not employed to counteract published dismal portrayals. We wonder why the Forest has not taken advantage of the Cranberry V.I.S. Center to clearly display the even-age management system. Again, these inadequacies reflect larger deficiencies. By and large, at a time when public attitudes and hunger for resource knowledge is vastly expanding, a parallelling change in I&E efforts of equal magnitude does not exist. There has been increased sensitivity--but not in proportion to the increased awareness, and increased funds--but not in proportion to increased needs. No significant change in organization has resulted, or at least not to the extent that reflects the increased complexities of a public-relations effort which must now sell programs in every available market place to continue the Service's rightful existence as a highly capable resource management agency.

The credibility gap

How did a few vocal opponents to clearcutting so readily attract the public support that ultimately resulted in this Committee's review? The answer, very likely, is that people are becoming less readily inclined to accept, express confidence in, or support Forest

Service programs. In part, we believe this stems from a surfeit of self-serving publicity. To a considerable degree the Service is a victim of its own propaganda and attitudes; some examples, specific and general:

1. Official statements that multiple use is actively pursued when, in truth, it is under-planned and under-manned.

2. Early emphasis that all-age management was the best forest-management system followed by an abrupt change in policy to even-age management.

3. Continuing to publicize the half-truth that forests prevent floods with the implication that forest cutting causes floods.

4. Building a massive public conservation-education program around specific problems or resources, such as fire control and recreation, to the neglect of other major management issues. The Forest Service story is yet to be told by I&E.

5. Publishing self-commendatory brochures and annual reports of Forest Service activities that are dull or exaggerated.

6. Timidity in answering critics who employ hearsay and emotion to lambaste Forest Service management policies.

7. Self-assurance that if a program is technically right, it should automatically have public acceptance.

8. Implying that management-specialists take an active part in planning and designing timber sales when in actuality they do not.

Now, some of the vocal public on the Monongahela simply do not believe Forest Service statements. On the other hand, many Forest Service employees, themselves the victims rather than creators of the gap, have been upset and confused by the lack of acceptance. Generally, the Service has been telling people what it feels they want to hear. This underestimates the public and demeans the Service.

Failure to recognize major changes in public attitudes

Our present or traditional concept of I&E or public relations as evidenced by the record on the Monongahela National Forest is insufficient to cope with or respond to today's public. Nationwide there is no evidence of basic change in our I&E program that parallels the momentous change in public awareness of environmental and resource values. In respect to the Monongahela this has been made more serious by coincidence of increased ecological awareness with a major change in timber management practices. The same change in our practices a few years ago would not have evoked as much comment. Today the Service operates under the eyes of a critical public keenly aware of the credibility gap and familiar with the power of protest. For whatever the reasons, today's public seems aware of the fact that if the total spectrum of values is not considered now, many choices will soon be eliminated from considerations. This concern is evidenced in the public's statements on the Monongahela situation. Correspondence and newspaper articles and conversations with citizens repeatedly made this point. The message which comes through the mass of statements, written and oral, is that we have not convinced them that our present system is considering and will adequately consider their mix of values, and they do not favor what in their minds is a drastic change from long-established and strongly defended practices.

Research

In several lengthy discussions of land-management problems with the Forest staff, conclusions seemed to be that answers were not available. There was some concern as to the objectivity of research, some wondered if, for instance the Fernow Experimental Forest was now trying to prove that even-age management was as superior a system as all-age management was once credited to be. Also, there is some question as to the adequacy of communications between Forest and Fernow staffs concerning research needs and application of research findings. Among deficiencies in knowledge, timber management-wildlife relationships were most frequently mentioned. For example, in planning removal of an overstory that contains mast bearing trees there is no good information as to management potentials in terms of numbers of animals or birds or how many trees should be left to support them. Neither is there

good information on the increased number of deer, grouse, turkeys, and other game that would be supported by the browse, berries, fruits, cover and "edge effect" that would be created by a regeneration cut. Foresters know with some degree of accuracy what timber growth will be under different silvicultural options but information is weak on management potentials for other resources, particularly as to what the trade-offs should be between management for timber and other resources.

The Committee noted the following specific areas where research was needed:

1. Even-age management effects on turkey.

2. Water quality of subsurface flow from clearcut areas.

3. Ability of oak stands to perpetuate themselves under fire protection.

4. Regeneration of more desirable species following clearcutting of yellow birch at high elevations.

5. Development of markets for small materials from even-age management.

6. Public reaction to and involvement in National Forest management.

PART IV RECOMMENDATIONS

General Recommendations

1. Review implementation of the multiple-use policy

   The time lag between the announcement of the national multiple-use policy and effectuating a program on the Forest requires examination to understand why it happened, and more productively, to examine Washington Office-Region-Forest communications.

2. Set realistic goals for multiple-use

   Multiple-use planning should be in accord with accomplishment capability. Extravagant statements on multiple-use policy without performance is morally indefensible and subjects the Service to well-deserved criticism.

3. Inventory public needs and Forest resources

   As rapidly as possible, public needs and Forest capabilities should be assessed and evaluated. The public should be informed as to the purpose and scope of these inventories and they should be asked to present their estimates as to needful uses.

4. Expand the I&E Program

   I&E should undertake a sustained productive program to restore public confidence and to describe adequately the Forest's policies and programs.

5. Strengthen research contributions

   Research should consider the deficiencies in knowledge described in this report and, more specifically, work more closely with the Forest staff to provide the knowledge necessary to further the Forest's program.

Specific Recommendations

Timber

1. A detailed plan of management activities, especially regeneration cuts, in each forest compartment for the decade ahead should be prepared in FY 1971 in consultation with all resource managers. General plans for the entire timber rotation should also be prepared.

Water

1. Closer supervision should be given to location of logging roads and landings in timber sale areas and to stricter compliance to contract stipulations for water-quality control.

Wildlife

1. The Forest should be provided with a full-time wildlife biologists to assist the Supervisor's staff in developing long-range multiple-use plans and assist West Virginia biologists in developing a State wildlife management plan. The Forest should encourage and help the West Virginia Department of Natural Resources provide a professional wildlife biologist on each of the 10 State management units.

2. An inventory of primary wildlife areas such as oak-hickory types, bear sanctuaries, spring seeps, and native trout headwaters should be initiated immediately.

3. Goals should be established for wildlife management on the Forest.

4. The Forest should develop for in-Service training and public education at least one model compartment managed primarily for fish and wildlife benefits.

Recreation-esthetics

1. Landscape architects should actively participate in the multiple-use planning of all sales.

Multiple-use

1. Training and financing should be provided to insure a full resource team at all decision points in the multiple-use management system, especially long-range planning, compartment examination and prescription, and sales administration.

2. Ad hoc advisory committees of interested citizens should be consulted at various points in the planning process.

3. The proposed sale plans for Middle Mountain (White Sulphur Springs District) should be re-examined. A revised schedule of management activities should consider fully opportunities for stabilizing water flow and for providing high, stable populations of wildlife. The investments of research to date should not deter this re-examination and possible modification of cutting plans.

4. Management activities in Meadow Creek (White Sulphur Springs) should be reviewed, with the goal of planning long-range needs for additional recreation sites, increased hunting-fishing activities, wildlife habitat, water yields, and timber production; plans for converting substantial acreage to white pine should be carefully reconsidered.

I&E

1. Scope and intensity of I&E activities should be greatly increased to anticipate trends in public opinion and to minimize controversy.

2. The traditional show-me trip approach should be expanded into more productive techniques aimed at specific educational objectives.

Research

1. Research should appraise effects of timber management systems on all forest resources and to develop a full array of alternatives for wildlife, timber, water production or any combination of these goals.

2. The Service should contract with a University with appropriate skills in sociology and information management to develop methods of appraising public desires for and reaction to forest management, and predicting long-term needs in the field of public information and education.

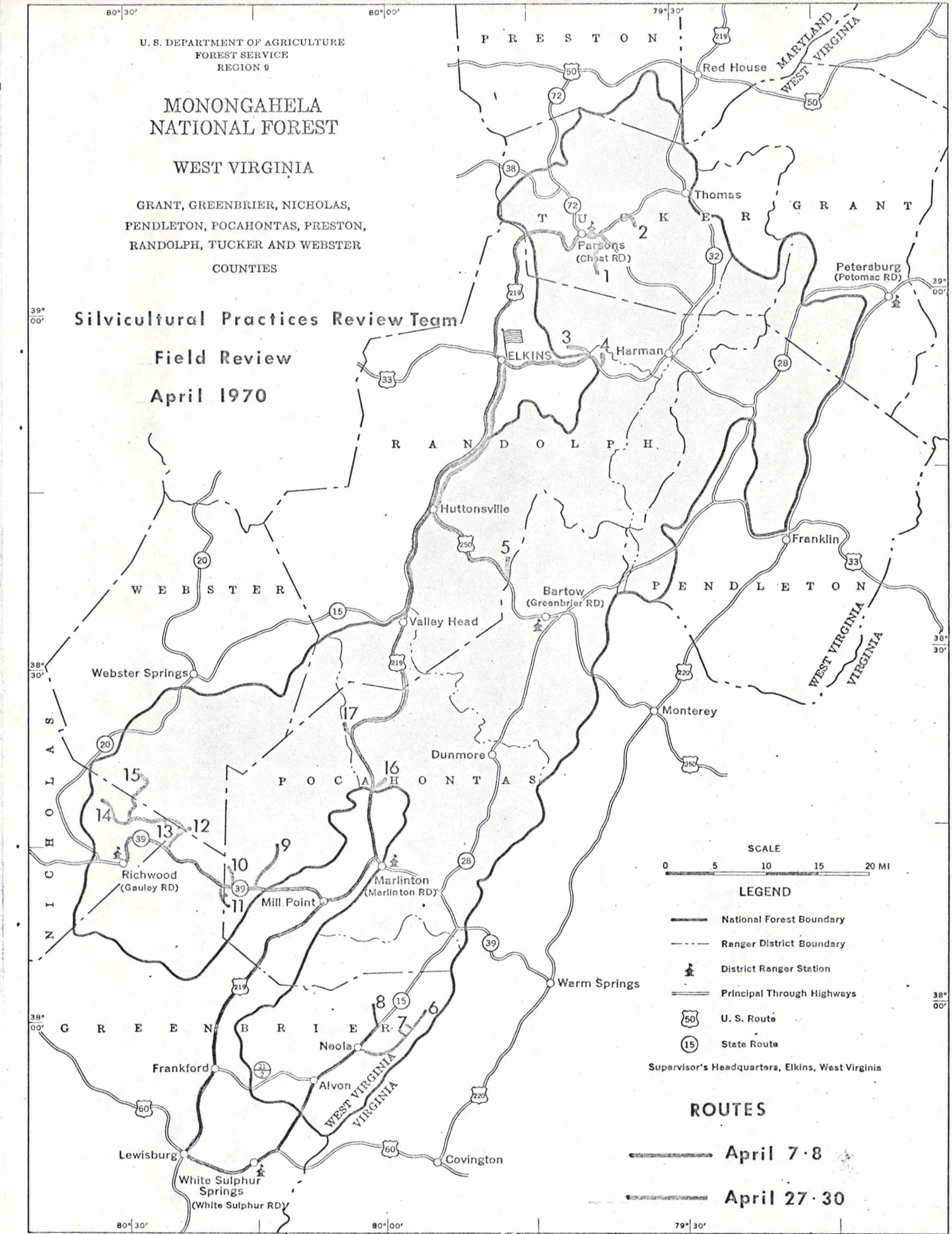
APPENDIX

Silvicultural Practices Review Team Field Review

Monongahela National Forest

1970

Map No.	Date	Ranger District	Location
1	April 7	Cheat	Fernow Experimental Forest
2	April 7	Cheat	Backbone Mtn. Sale Area - 2 stops
3	April 8	Cheat	Bickle Knob Sale Area
4	April 8	Cheat	Stalnaker Run Sale Area
5	April 8	Greenbrier	Glade Run Sale Area
6	April 27	White Sulphur	Lake Sale Area
7	April 27	White Sulphur	Burnt House Sale Area - 2 stops
8	April 27	White Sulphur	Middle Mountain - Proposed Sale
9	April 28	Marlinton	Big Spruce Sale Area Overlook
10	April 28	Gauley	Dogway II Sale Area
11	April 28	Gauley	Bear Run Sale Area - 2 stops
12	April 29	Gauley	Goose & Pheasant Sale Area
13	April 29	Gauley	Hunters Run Sale Area
14	April 29	Gauley	Jakeman Run Sale Area
15	April 29	Gauley	Adkins Rockhouse Sale Area
16	April 30	Marlinton	Cloverlick Sale Area
17	April 30	Marlinton	Blasted Bridge Sale Area



Milwaukee, 1966

PAST AND CURRENT USE OF THE FOREST

Timber Sold (mean annual)

Period	MBF	Value
1920-30	569	$ 1,904
1931-40	800	2,184
1941-50	8,753	104,465
1951-60	12,470	217,835
1961-69	41,158	647,420

Recreation Use (visitor-days)

Year	
1967	904,000
1968	932,000
1969	996,000

Wildlife Harvest

Year	Deer[1/]	Turkey	Bear
1955	1,704	656	26
1956	3,390	574	37
1957	1,111	572	31
1958	2,824	383	31
1959	3,811	650	25
1960	2,860	330	53
1961	731	320	8
1962	893	327	50
1963	1,178	260	30
1964	1,146	363	41
1965	2,870	478	50
1966	3,537	404	14
1967	2,931	363	39
1968	1,854	555	58

[1/] Types of seasons have greater effect on size of kill, than any other factor--for instance, hunter's choice or bucks only.

INTERVIEWS

Note: The following notes from interviews and correspondence with 19 interested laymen, foresters, and other professional people reflect their views on even-age management. No attempt was made to influence their comments.

John Bowling, State Senator; W. Va. Natural Resources Commision; hardware business; White Sulphur Springs, W. Va.

> Should keep clearcut area to 35 acres or less. Forest Service should admit mistakes, talk to conservation groups.

Ed Buck, Mayor of Richwood, W. Va.

> Fearful that excessive clearcutting in the upper drainage North fork, Cherry Creek will cause floods in Richwood. Referred to Forest Service publication "Forests for the Future[12/] which states that clearcuttings "helps fill reservoirs" and increase water yield by as much as 140,000 gallons per acre during the first year. Believes that small clearcuts (30 or 40 acres, even an occasional 100-acre one) would not contribute seriously to flooding if spaced far apart and scheduled over a rotation. Such a cutting pattern and cutting schedule would be beneficial to wildlife. Repeated several times that as Mayor, he was afraid of floods and the damage they would cause to life and property in Richwood.

Robert Daoust, West Va. District Forester (District #5, Southwestern West Va.)

> Even-age management perfectly legitimate, will recommend it for state forests. Areas as large as 100 to 135 acres would not endanger scenery. Need an agency like Forest Service to resolve conflicts of interest.

12/ Forests for the future, U. S. Dept. Agri., Forest Service, 1969.

Howard Dietz, owner, shoe store; Richwood, West Va.

Opposes even-age management as the only management system, should be used only under special conditions. Not opposed to EAM as a tool; will grow most wood fibre. All-age management should be the normal system. EAM is liquidating valuable mature hardwoods, will be a gap in production if it continues. Research has been inadequate; 7 years of studies at Fernow not long enough. If EAM policy continued, the Forest may become a National Park. State Legislature and Congressional delegation against EAM. Hurts tourism and watershed protection. Introduced too rapidly, too soon.

Lawrence Dietz, real estate, insurance, West Va. Natural Resources Commission, Richwood, West Va.

A good National Forest with variety of uses makes for controversy. All uses are not compatible, should make them compatible as possible, not turned over to any one use. Not all uses are now given equal voice. How can a rotation be established to get sufficient mast when most of Forest has young timber? Also, den trees are not left. Main objection: There is an overall lack of long-time planning in timber and game management. For instance, there is not enough mature timber in Gauley District. Cut it all by EAM, what then? Forest should be used to stabilize timber supply. Also deer browse is being increased by clearcutting, but no plan to continue increase. EAM requires a pulp market for thinnings; pulp market uncertain. EAM will not give desirable species. On Gauley will result mostly in poplar at low elevations and river birch at high. Forest Service should give more thought as to what timber crop should be 100 years from now. Radically changing the nature of the Forest by EAM. Clearcuts damage the soil, nutrients are lost. May be taking too much timber out of production by special uses. Cranberry Glades vegetation unique: would like to see audio-visual library of natural vegetation at Visitors Center.

Claude Jones, Manager, Radio Station WRON; President, local Chapter Izaak Walton League; White Sulphur Springs, West Va.

> Credibility gap with Forest Service dates back to 1964. Clearcut areas too large and too close together. Forest Service public relations needs patching up.

Walt Lesser, Ray Menendez, Jim Pack, Kermit Rinell. West Va. Natural Resources Dept. Biologists, stationed at Elkins, W. Va.

> Forest Service staff - State Wildlife biologists relations good. Support Forest Service's responsibility for making final decisions on land management and accept wildlife as one of multiple resources on the Forest. Would like to look at plans for sales in terms of management unit goals rather than on an individual sale basis. White pine should not average more than 25% of stand composition. A State Wildlife Plan is being developed but final plan is likely two years away. EAM and wildlife-fisheries management compatible. Major factor limiting trout production is stream acidity.

Donald McClung, coal mine employee, turkey hunter, Richwood, West Va.

> Rigid policy of EAM is not in keeping with multiple use. EAM does have its place. Should have a wildlife biologist on District staff. Some Richwood people waiting for the next clearcutting to take this issue to law courts.

James S. Paxton (letter). Consulting forester for 12 years; member: West Virginia Forest Practices Commission

> Favors use of even-age management as a tool in forestry. Before private owner can apply, some more work is needed on the economics of the system, especially injection of remaining trees and release of crop trees. In 12 years of practice, has not had opportunity to recommend EAM to clients; markets for low-grade or product-size material will be necessary before any great use of even-age management by industrial or consulting foresters. Noted a seemingly concentration of cuts in the Gauley District and understands the concern of hunters and fishermen. Forest Service should establish closer relationship with the general public to keep them informed on multiple-use plans.

Robert W. Smith, professor of wildlife management, West Va. University, Morgantown, West Va.

> Forest Service needs more aggressive I&E programs on wildlife habitats in relation to even-age management. Wildlife factors can determine the size of clearcut areas under EAM. Question use of "desirable" species only in economic terms. Georgia-Pacific criticized for clearcuttings near Charleston.

Ralph Smoot, retired forester (USFS). Camden on Gauley, West Va.

> EAM is all right where properly used but should not be used by Rangers to fill their timber quota. Ice damage can be a major problem. Groups of trees should be left for wildlife.

John Tillinghast (interview and letter). Consulting forester since 1946. Danville, West Va.

> Difficult to determine what Forest users want of Forest. I have used EAM for many years under certain conditions and owners never complained. Do not recommend clear-cutting in every site: normally do not propose clear-cutting more than 100 to 200 acres in any single year. No need for EAM to conflict with other uses. Five years after clearcutting the average viewer probably would not realize what had taken place. Perhaps 10 percent of our annual cutting is by clearcutting (our clients own about 200,000 acres). Current furor due to: (1) lack of professional knowledge on the part of many critics supplemented by extreme emotion; some people never listen; (2) lack of adequate preparation of the public by USFS for change in policy and practice; (3) lack of sensitivity of USFS to local public opinion and absence of adequate educational effort to counter critics; (4) unwillingness of legislative and civic leaders to learn the facts until forced into the problem by a small, over-emotional segment of the population representing special interest groups.

E. H. Tryon, professor of silviculture, West Va. University, Morgantown, W. Va.

Threat of moratorium on clearcutting tended to unite all foresters for fear it might extend to private lands. West Va. Pulp and Paper Company has been criticized on watershed considerations for clearcutting several hundred acres on company lands.

Eugene Weitzler, drug store owner; president, Chamber of Commerce, Richwood, West Va.

Should be able to drive into back country. Works 6 days a week and doesn't have time to walk in. Hates to see mountain sides denuded. Theoretically, clearcutting is good, young trees get more sunlight. Den trees should be left. EAM makes sense. Supervisor's Office does not get out enough information and publicity.

David White, Director, Div. Forestry, West Va. University, Morgantown, W. Va.

Controversy over National Forest management shows need of public education, should inject forest management into the public school system beginning with the 4th grade. TV should be used more; University made a film on conservation for $3,000 that will reach 1 million people. Part of present problem is development of conservation groups headed by ambitious professionals who seek causes, publicity, and increased membership.

Merle White, former Mayor, Richwood, West Va.

Clearcuttings look bad, opposed to them, used too extensively. Likes outdoors, hates to see it annihilated. Not a preservationist, trees should be cut, selective cutting all right. Early clearcuttings did not take old den trees. Objects to 2-4-5 T in frills. Tourists repelled by clearcuts, particularly hunters and fishers.